CLAIMS

1. Transmission device for transmitting data elements of a data stream based on priority to a receiving device, comprising:

a transmitter controller for obtaining data elements of a plurality of data element classes, each of the data element classes associated with a priority;

a buffer fill level detector for obtaining information on buffer fill levels of data element buffers at the receiving device for the plurality of data element classes; and

wherein the transmitter controller is adapted to transmit data elements of a data element class with a first priority for reaching the associated buffer fill level and, if the buffer fill level detector determines that the buffer fill level of the data element class with the first priority is reached, to transmit data elements of a data element class with a second priority, the second priority being lower than the first priority.

2. Transmission device according to claim 1, wherein the transmitter controller is adapted to transmit data elements of data element classes with further priorities, the further priorities being successively lower, if the buffer fill level detector determines that the buffer fill level of the data element class with a respective priority is reached.

3. Transmission device according to at least one of the preceding claims, wherein the transmitter controller is adapted to adjust a transmission rate of the data elements of each respective data element class for maintaining the associated buffer fill level.

4. Transmission device according to at least one of the preceding claims, wherein, if a buffer fill level of a data element class cannot be reached due to reaching a bandwidth limitation, the transmitter controller is adapted to drop data elements of all data element classes with lower priorities.

5. Transmission device according to at least one of the preceding claims, wherein the buffer fill level detector is adapted to estimate buffer fill levels at the receiver.

6. Transmission device according to at least one of the preceding claims, wherein the buffer fill level detector is adapted to periodically receive a message from the receiver indicating the buffer fill levels at the receiver.

7. Transmission device according to at least one of the preceding claims, wherein the buffer fill levels correspond to a respective playout length of time of the data elements and wherein the playout lengths of time are selected to decrease with decreasing priority.

8. Transmission device according to at least one of the preceding claims, including link loss duration determining means for determining durations of link losses within a predetermined time period and for computing a mean link loss duration and wherein the playout lengths of time are selected based on the computed mean duration of a link loss.

9. Transmission device according to at least one of the preceding claims, wherein the playout length time of the data element class with the highest priority is set to

match or exceed the maximum detected link loss duration during the predetermined time period.

10. Transmission device according to at least one of the preceding claims, wherein the target buffer fill levels are increased with the lapse of transmission time of the data stream after a start up condition or a rebuffering event.

11. Transmission device according to at least one of the preceding claims, wherein the transmitter controller is adapted to determine a time out limit for each data element, the time out limit indicating a latest allowable point in time for transmitting a data element to meet real time requirements, and to drop data elements where the time out limit is exceeded.

12. Transmission device according to at least one of the preceding claims, wherein, if all buffer fill levels can be reached, the transmitter controller is adapted to switch to an earliest deadline first transmission mode.

13. Transmission device according to at claim 11, wherein, if the transmitter controller is in the earliest deadline first transmission mode and if at least one buffer fill level cannot be maintained, the transmitter controller is adapted to switch back to the priority based transmission.

14. Transmission device according to at least one of the preceding claims, wherein, if a buffer fill level value is below a predetermined threshold, the transmitter controller is adapted to switch to an earliest deadline first transmission mode.

15. Transmission device according to at least one of the preceding claims, wherein the transmitter controller is

adapted to switch to an earliest deadline first transmission mode upon a transmission start event and/or upon a rebuffering event.

16. Receiving device for receiving data elements of a data stream based on priority from a transmitting device, comprising:

a receiver controller for receiving data elements of a plurality of data element classes, each of the data element classes associated with a priority;

a plurality of data element buffers, provided for storing data elements of each of the data element classes; and

a buffer fill level reporter for reporting information on buffer fill levels of data element buffers at the receiving device for the plurality of data element classes to the transmitting device, for enabling a transmitter controller at the transmitting device to transmit data elements of a data element class with a first priority so that the associated buffer fill level is reached and, if the buffer fill level of the data element class with the first priority is reached, to transmit data elements of a data element class with a second priority, the second priority being lower than the first priority.

17. Method for transmitting data elements of a data stream based on priority to a receiving device, comprising:

obtaining data elements of a plurality of data element classes, each of the data element classes associated with a priority;

obtaining information on buffer fill levels of data element buffers at the receiving device for the plurality of data element classes; and

transmitting data elements of a data element class with a first priority for reaching the associated buffer fill level and, if the buffer fill level detector determines that the buffer fill level of the data element class with the first priority is reached, transmitting data elements of a data element class with a second priority, the second priority being lower than the first priority.

18. Method according to claim 17, including transmitting data elements of data element classes with further priorities, the further priorities being successively lower, if the buffer fill level of the data element class with a respective priority is reached.

19. Method according to at least one of the claims 17 and 18, including adjusting a transmission rate of the data elements of each respective data element class for maintaining the associated buffer fill level.

20. Method according to at least one of the claims 17 to 19, including, if a buffer fill level of a data element class cannot be reached due to reaching a bandwidth limitation, dropping data elements of all data element classes with lower priorities.

21. Method according to at least one of the claims 17 to 20, including estimating buffer fill levels at the receiver.

22. Method according to at least one of the claims 17 to 21, including periodically receiving a message from the receiver indicating the buffer fill levels at the receiver.

23. Method according to at least one of the claims 17 to 22, wherein the buffer fill levels correspond to a respective playout length of time of the data elements and wherein the playout lengths of time are selected to decrease with decreasing priority.

24. Method according to at least one of the claims 17 to 23, including determining durations of link losses within a predetermined time period, computing a mean link loss duration and selecting the playout lengths of time based on the computed mean duration of a link loss.

25. Method according to at least one of the claims 17 to 24, including setting the playout length time of the data element class with the highest priority to match or exceed the maximum detected link loss duration during the predetermined time period.

26. Method according to at least one of the claims 17 to 25, including increasing the target buffer fill levels with the lapse of transmission time of the data stream after a start up condition or a rebuffering event.

27. Method according to at least one of the claims 17 to 26, including determining a time out limit for each data element, the time out limit indicating a latest allowable point in time for transmitting a data element to meet real time requirements, and dropping data elements if the time out limit is exceeded.

28. Method according to at least one of the claims 17 to 27, including, if all buffer fill levels can be reached, switching to an earliest deadline first transmission mode.

29. Method according to at claim 28, including, if at least one buffer fill level cannot be maintained, switching back to the priority based transmission.

30. Method according to at least one of the claims 17 to 29, including, if a buffer fill level value is below a predetermined threshold, switching to an earliest deadline first transmission mode.

31. Method according to at least one of the claims 17 to 30, including switching to an earliest deadline first transmission mode upon a transmission start event and/or upon a rebuffering event.

32. Method for receiving data elements of a data stream based on priority from a transmitting device, comprising:

receiving data elements of a plurality of data element classes, each of the data element classes associated with a priority;

data elements of each of the data element classes in a plurality of buffers; and

reporter for reporting information on buffer fill levels of data element buffers at the receiving device for the plurality of data element classes to the transmitting device, for enabling the transmitting device to transmit data elements of a data element class with a first priority so that the associated buffer fill level is reached and, if the buffer fill level of the data element class with the first priority is reached, to transmit data elements of a data element class with a second priority, the second priority being lower than the first priority.

33. A program having instructions adapted to carry out the method of any one of claims 17 to 32.

34. A computer readable medium, in which a program is embodied, wherein the program is to make a data processing device execute the method of any one of claims 17 to 32.

35. A computer program product comprising the computer readable medium of claim 34.